

GOVERNMENT CO-OPERATIVE POLYTECHNIC, JAGDALPUR BILASPUR (C.G)

DEPARTMENT OF ELECTRICAL ENGINEERING

Syllabus SESSION PLAN

Session: - April-May 2025

Semester: - 6th

Session start date as per University Calendar - 06/01/2025

Course Name: - Energy Conservation & Energy Audit

Course Code: - 2024682(024)

Name of Subject teacher:- AJAY KUMAR SAWARNKAR

Unit 1.0 Energy conservation measures and Management				
Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
1.1 Current energy scenario in India: Demand supply gap, need of electrical energy conservation.	2	1.1 List various energy management systems prevailing in a particular industry/Organization on	1	
1.2 Review of various sources of renewable and non-renewable sources of energy.	2	1.2 Identify the energy management skills and strategies in the energy management system of a particular industry/Organization on.	1	
1.3 Concept of energy management and its objectives	1	1.3 Visit the web site of BEE and MEDA/CREDA and collect the information on energy conservation activities and prepare a report.	1	
1.4 Difference between energy management, energy conservation, energy audit and energy efficiency.	2			
1.5 Role of Bureau of Energy Efficiency (BEE) and Government Organizations such as NPC, MNRE, BEE, MEDA in energy conservation.	2	1.4 Conduct an interview with the energy manager regarding energy conservation.	1	
1.6 Functions of Energy rating: Star labeling of equipment.	1			
1.7 Features of energy conservation act 2001	1			
1.8 Energy Units and conservations				
1.9 Pay back period, Internal Rate of Return, Depreciation	1			
1.10 Role of ESCO	2			
1.11 Difference between ESCO and EPC				

Number of periods planned (CI + LI) : 18

Number of periods actually taken :

Unit 2.0 Energy Conservation in Power System

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
2.1 Energy conservation in generation – Solar, wind, Bio energy, Cogeneration, Fuel cell technology(Case study)	1	2.1 Analyze the case study of energy conservation in generation by solar, wind, bio energy, cogeneration and fuel cell technology or any recent technology of generation estimating saving in period also. 2.2 Collect the energy bills of various residential consumers and prepare a report on production of electricity 2.3 Visit Automatic power factor correction unit in industrial, commercial utility and observe its working. 2.4 Estimate electrical energy saving by capacitor bank power factor and load compensation with case study in units and cost.	1	
2.2 Power factor, Causes and effects of low power factor, power factor improvement and its Importance, Methods of power factor improvement(Numerical on above)	2			
2.3 Most economical power factor, Selection and location of power factor correcting equipment	1			
2.4 Assessment of Transmission and Distribution (T&D) losses in power system: Technical and commercial	1			
2.5 Demand-Side management (DSM): objectives; methodology	1			
2.6 Energy conservation equipment : ➤ Maximum Demand Controller ➤ KVAR Controller Automatic Power Factor controller.	1			
2.7 Tariff, desirable characteristics of tariff	1			
2.8 Types of tariff- Simple tariff, flat rate tariff, block rate tariff, two part tariff, M. D. tariff, power factor tariff, Time-off-day tariff, Peak-off day tariff, Load factor tariff Introduction to availability Based Tariffs (ABT),Recent Chhattisgarh State Power Distribution Company Limited (CSPDCL) tariffs for different consumers. (Simple Numerical on above topic)	1			

Number of periods planned (CI + LI) : 13

Number of periods actually taken :

Unit 3.0 Energy conservation in lighting system

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
3.1 Basic parameters and terms used in lighting system (Illumination).	1	3.1 Collect information by market survey and prepare report on rating, luminous output, cost, list of various types of luminaries (FTL, HPMV) 3.2 Collect data on the energy conservation taken in street lighting.	1	
3.2 Recommended Luminance levels	1			

3.3 Procedure for assessing existing lighting system in a facility.	1	3.3 Determine the reduction in power consumption by replacement of FAN and regulators in class room/ laboratory.	2	
3.4 Energy conservation techniques in lighting system. <ul style="list-style-type: none"> ➤ By replacing Lamp sources. ➤ Using energy efficient luminaries ➤ Using light controlled gears ➤ By using the advance technology ➤ By installation of separate Transformer / servo stabilizer for lighting. ➤ Periodic survey and adequate maintenance programs ➤ Lighting maintenance. ➤ Centralized Control Equipment (Microcontroller based). ➤ Occupancy sensors/Motion Detectors ➤ Control gears: Dimmers, Regulators and Stabilizers. 	1	3.4 Compare the power consumption of different types of Tube-light with choke, electronic ballast and LED lamps by direct measurement.	2	
Number of periods planned (CI + LI) : 10 Number of periods actually taken :				

Unit 4.0 Energy conservation in electrical motors and Transformers

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
4.1 Need and significance of energy conservation in motors and transformers.	1	4.1 Case study on the energy conservation techniques implemented in electrical motors.	1	
4.2 Difference between energy efficient and standard motors.	1	4.2 Determine the Power saving in star mode operation of Induction motor compared to delta mode.	1	
4.3 Construction, working and advantages of Energy Efficient motors.	1			
4.4 Energy conservation techniques in Induction motor, the work horse of the industry: 4.4.1 By improving Power quality. 4.4.2 By motor survey. 4.4.3 By matching motor. 4.4.4 By minimizing the idle and redundant running of motor. 4.4.5 By operating in star mode. 4.4.6 By rewinding of motor. 4.4.7 By improving mechanical power and transmission efficiency	2	4.3 Determine the '% loading' along with the related efficiency for different loads of given Induction motor. 4.4 Control speed of a 3 phase induction motor using VFD. 4.5 Analyze the Specifications of a energy efficient motor.	1 1 1	

<p>4.5 Function of Energy conservation equipment related to electrical motors:</p> <ul style="list-style-type: none"> ➤ Soft starter: For induction motors ➤ Power Factor Controller ➤ Static capacitor Automatic star delta starter <ul style="list-style-type: none"> ➤ Variable Frequency Drives. <p>4.6 Energy efficient transformer, its features amorphous transformer; epoxy Resin cast transformer/ Dry type of transformer</p>	2			
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Number of periods planned (CI + LI) : 12
Number of periods actually taken :

Unit 5. Energy Audit

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
5.1 Electricity act 2003 (statement)	1	LES.1 Prepare a sample energy audit report of your workshop/ lab, by using various energy audit instruments.	1	
5.2 IE rules and regulations for energy audit.	1			
5.3 Energy Flow Diagram and its significance.	1	LES.2 Prepare a sample energy audit questionnaire for a educational institute, implement it and prepare a report.	1	
5.4 Energy audit instruments and their use.	1			
5.5 Questionnaires for the energy audit.	1	LES.3 Visit to any one organization such as Hospitals, public library or any commercial building.	1	
5.6 ABC analysis.	1	prepare questionnaire for implementation energy conservation program.		
5.7 Internal energy audit checklist.	1			
5.8 Procedure of Energy audit (walkthrough audit and detailed energy audit)	1			
5.9 Simple payback period and return on investment	1			
5.10 Examples on small Energy conservation projects. (Numerical).	1			
5.11 Instruments for Audit - basic role and usage guidelines for instruments like digital multi-meter, tong tester, Lux meter, power analyzer , flow meters, thermal imager, temperature indicators, digital pressure meter	1			

Number of periods planned (CI + LI) : 14
Number of periods actually taken :

Number of Total periods planned : 67
Number of Total periods actually taken :

Subject Teacher : AJAY KUMAR SWARNKAR



(Name and Signature)

HOD
(Department of Electrical Engineering)

Principal
Govt Co-ed Polytechnic , Bastar

GOVT. CO-ED POLYTECHNIC JAGDALPUR
ADAWAL, DIST - BASTAR (C.G.) 494001
DEPARTMENT OF ELECTRICAL ENGINEERING
LESSON PLAN SESSION-(April-May) 2025

NAME OF FACULTY : Tejeshvarya

SUBJECT : Entrepreneurship Development and Management

SUBJECT CODE : 2000673(037)

SEMESTER : Diploma (6th)Sem

TEXT BOOKS Entrepreneurial Development:Desai Vasa
 Entrepreneurship Development and small Business Enterprises:Charantimath M.

REF. BOOKS The Business Planning GUIDE:H.Bangs David
 Entrepreneurial Development:Sharma sangita

Serial NO.	UNIT	TOPIC TO BE COVERED	Expected no of lectures	REMARKS
		Unit 1.0 Characteristics of entrepreneurs		
1	1			
2		1.1 Concept of entrepreneur and intrapreneur	1	
3		1.2 Benefits of becoming an intrapreneur/entrepreneur	1	
4		1.3 Scope of entrepreneurship in local and global market.	1	
5		1.4 Planning for establishment of an enterprise.	2	
6		1.5 Traits of successful intrapreneur/entrepreneur and passion, initiative, independent decision making, team work, assertiveness, persuasion, persistence, information seeking, commitment to work contract etc. SW analysis. Team work simulation.	3	
7		1.6 Trait of successful entrepreneur: calculated risk taking. Risk taking simulation exercise.	1	
8		1.7 Business opportunity Guidance	1	
		Unit 2.0 Motivation Management		
9	2			
10		2.1 Motives, motivation and motivational cycle.	2	
11		2.2 Concept of Need for Achievement.	2	
12		2.3 Need for Achievement assessment through various tools.	1	
13		Ring toss game	1	
14		Boat making exercise	1	
15		Building block exercise	1	
16		TAT stories	1	
17		Who am I?	1	
18		2.4 Interpretation and action plan for self development.	1	
19	3	Unit 3.0 Management of Creativity. Check list of questions..		
20		3.1 Creativity: Divergent thinking, creativity techniques. Six thinking hats.	3	
21		3.2 Innovation, types and applications Case study of innovative first generation entrepreneur	3	
22		3.3 Product life cycle, New product development process. Product development and innovation through creativity and innovation.	5	
		Unit 4.0 Critical Resources		
23	4	4.1 Forms of business organization:		
24		Proprietorship,	1	
25		Partnership, Cooperative,	1	

Sl. No.	Topic	Approximate no. of sessions	Remarks
27	Private, Public Ltd		
28	Company, Section 8		
29	company, LLP	1	
30	4.2 Institutional Support for entrepreneurship:		
31	MSMESI, CED, DTIC, CITCON, CSIDC, LUN, NSIC, KVIC, NABARD, Banks, SIDBI	2	
32	4.3 Entrepreneurship promotion schemes of centre and state.	1	
33	4.4 Marketing Mix, Market survey for project identification	2	
34	4.5 Inventory control, vendor development, material movement, store management.	2	
35	4.6 Manpower plan, hiring process, compensation, performance appraisal.	1	

Sl. No.	Topic	Approximate no. of sessions	Remarks
	Unit 5.0 Sustainable business plan		
36	5.1 Format of business plan/techno-economic feasibility report.	3	
37	5.2 Demand and annual production target based on market survey.	1	
38	5.3 Outline production/service process.	1	
39	5.4 Land, building and machinery requirement.	1	
40	5.5 Power, utilities and raw material requirement.	1	
41	5.6 Fixed capital, Working capital, Subsidy and Cost of Project	1	
42	5.7 Means of finance, calculation of interest.	1	
43	5.8 Profitability analysis, Break-even point.	1	
TOTAL SCHEDULED CLASSES: 53			
TOTAL CLASSES TAKEN:		Signature of Faculty	HOD Signature

Tejeshwara

GOVERNMENT CO-ED POLYTECHNIC, JAGDALPUR BASTAR(C.G)

DEPARTMENT OF ELECTRICAL ENGINEERING

LESSON PLAN

Session:- APR-MAY June 2025

Semester:- 6th

Session start date as per University Calendar:-

Course Name:-Utilization of Electrical Energy & Traction

Course Code:-2024671(024)

Name of Subject teacher:-ONKAR DEWANGAN

Unit -1 Electrical Drives				
Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
1.1Types of electrical drives	1	1.1Identify the different drives used in material handling system.	1	
1.2Motors used for electrical drives; DC series, shunt and separately excited motors, Induction Motor	1	1.2Determine Torque / speed and Torque /current characteristics of DC motor.	1	
1.3Selection of Electrical motors	1	1.3 Determine Torque / speed and Torque / current characteristics of three phase induction motor.		
1.4Torque / speed and torque / current characteristics of DC series, shunt and separately excited motors, characteristics of three phase induction motors	3	1.4Test the temperature rise and the steady state value for a given motor for under rated loading condition.	1	
1.5Heating and Cooling of electrical motors-Heating and cooling curves, insulating materials	2			
1.6Size and rating of motors standard ratings of motors, classes of duty, ambient temperature and ratings, motors used for different types of applications, temperature rise with short time ratings	3			
1.7Types of load: Classification of loads with respect to time, classification of loads with respect to duty cycles. Enclosures for rotating electrical machines	2			

Number of periods planned (CI + LI) : 16

Number of periods actually taken :

Unit – 2 Electric Heating and Welding

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
2.1 Advantages of Electrical heating	1	2.1 Compare the various types of supply required for different types of welding.	1	
2.2 Essential Requirements of a good heating element, materials of heating element, causes of failure of heating element	2		2.2 Investigate the various electronic circuits used in welding.	
2.3 Methods of electric heating- resistance heating, arc heating, high frequency heating, induction heating, dielectric heating	4	2.3 Draw the characteristics of a welding generator.	1	
		2.4 Draw the basic circuit for electric arc furnace showing the arrangements of OCBs, Control panels, CTs through relays, furnace transformer and arrangement of electrode movement.	1	
2.4 Types of resistance welding, choice of welding time, electric arc welding, Types of welding electrodes	4			
2.5 Welding transformers and rectifiers	1			

Number of periods planned (CI + LI) : 16

Number of periods actually taken :

Unit – 3 Illumination

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
3.1 Introduction: Terms used in illumination, laws of illumination	3	3.1 Draw automatic illumination control circuits using LDR's	1	
3.2 Types of sources of illumination – Electric arc, incandescent, gaseous discharge, fluorescent	3	3.2 Measure intensity of light with lux-meter for various types of illuminating lamps	1	
3.3 Arc lamps, incandescent lamps, laser, LED, neon, Tungsten-Halogen and Sodium Vapour lamps, Fluorescent lamps	4	3.3 Draw the circuit diagram of a lighting of a two wheeler	1	
		3.4 Draw the circuit diagram of a lighting of a four wheeler	1	
3.4 Types of lighting schemes: direct, semi direct, Semi-indirect, Indirect lighting and general lighting schemes	3			
3.5 General ideas about street lighting, factory lighting and flood lighting	2			

Number of periods planned (CI + LI) : 19

Number of periods actually taken :

Unit – 4 Electric Traction Drives

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
4.1 Requirements of ideal traction system, advantages and disadvantages of electric traction	4	4.1 Investigate the various Electric drives used in traction system in Indian railways.	1	
4.2 System of track electrification-DC system, single phase AC system, three phase AC system, Composite system	4	4.2 Draw the layout of D.C locomotive and Diesel locomotive.	2	
4.3 Special mechanical and electrical features of traction motors, current collectors	2	4.3 Draw the power diagram of AC locomotive and its equipment.	1	
4.4 Traction motors: DC series, Three phase induction motors	4			
4.5 Types of electric braking: Plugging, Rheostat or Dynamic braking, Regenerative braking	4			

Number of periods planned (CI + LI) : 22

Number of periods actually taken :

Unit – 5 Other Aspects of Electric Traction

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
5.1 Types of service- Main line services, Urban services, suburban services	4	5.1 Determine the energy saving by series and parallel control of D.C motors	1	
5.2 Speed-time and speed distance curves for main line service, suburban service and urban and city service	3	5.2 Calculate tractive power and energy consumption for a basic electric traction system	1	
5.3 Basic definitions: Crest speed, average speed, schedule speed, schedule time, Factors affecting the schedule speed of a train	4	5.3 Calculate the energy recovered during regenerative braking	1	
5.4 Factors affecting the schedule speed of a train, Simplified	4			

trapezoidal and quadrilateral speed time curves, Tractive effort				
5.5 Specific energy consumption, dead weight, accelerating weight, adhesive weight, coefficient of adhesion, advantages and disadvantages of regenerative braking	4			

Number of periods planned (CI + LI) : 19

Number of periods actually taken :

Number of Total periods planned : 92

Number of Total periods actually taken :

Subject Teacher : ONKAR DEWANGAN



(Name and Signature)

Onkar Dewangan

HOD

(Department of Electrical Engineering)

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LESSON PLAN

Name of the faculty :- Mr. BHOLENATH TAMBOLI
Semester :- 6TH
Subject:- **WIND AND SOLAR POWER TECHNOLOGY**
Lesson Plan Duration (CL+LI+SL) :- 95 Hrs
Session- APR-MAY 2025

S.No.	No. Of Periods	Topic Name	Practicals	Remarks
	(Approx.Hrs: CL+ LI+SE+SL=16)	Unit-1.0 Use renewable sources of energy.		
1		1.1 Various sources of Energy – Conventional and Nonconventional.	LE1.1 Make a list of various non-conventional energy sources with its specifications, available in lab and explain its working using suitable diagram. LE1.2 Enlist applications of various nonconventional energy sources available in lab	
2		1.2 Importance of Non-Conventional Energy Sources.		
3		1.3 Energy Chain – Energy Flow block diagram from primary energy source to final energy consumption via electrical and non-electrical route.		
4		1.4 Advantages and disadvantages of conventional energy sources.		
5		1.5 Salient features of Nonconventional energy sources.		
6		1.6 Green Power- Definition and advantages.		
	(Approx.Hrs: CL+ LI+SE+SL=16)	Unit2.0 Wind Energy		
1		Wind Energy - Introduction, Factors effecting the distribution of wind energy on the surface of earth.	LE2.1 List the various parts of a small wind power training system. LE2.2 Dismantle the given small wind turbine and write the name of different parts. LE2.3 Assemble an already dismantled wind	
2		Variation of wind speed with height-existing formula and related plot		
3		Estimation of wind energy		

		at a site – Power in wind, empirical formula, Wind speed duration curve, Power versus wind speed characteristics.	turbine and check its proper working.	
4		Capacity Factor of a Wind power plant – Definition and formula.		
5		Selection of Site for a Wind Power Plant- Factors effecting wind power generation, important features.		
6		Important terms and definitions used in wind power plants – Blade, Chord, Wind Velocities, Angle of attack, Pitch angle (Blade setting angle), drag force, Lift force, Solidity.		
7		Elementary Fluid Flow concepts – nature of flow around a body, relative motion of fluid at the boundary wall, fluid friction, pressure difference, drag on a body, lift force.		
	(Approx.Hrs: CI+ LI+SE+SL=19)	Unit3.0 Wind Power Generation		
1		Introduction- block diagram of wind energy conversion systems (WECS).	LE3.1 Identify the power electronic devices and circuits in the small wind turbine. LE3.2 Test functioning of the power electronic devices used in given wind turbine. LE3.3 Perform minor repairs of given wind power Plant. LE3.4 Draw the plot of generated power versus wind speed for a small wind power trainer.	
2		Wind Turbines – Types (based on power generation capacity and based on horizontal or vertical rotor axis).		
3		Horizontal Axis Wind Turbine(HAWT) – (a) Main Components and diagram- Turbine blades, Hub, Nacelle, Yaw Control Mechanism & Tower) (b) Types of Rotors-single or multiple blades, Teetering of Rotor, Upwind and downwind machines.		

		(c) Yaw Control and Pitch control of Rotor.		
4		Vertical Axis Wind Turbine(VAWT) – (a) Main Components- Tower, Blades, Support Structure (b) Rotors-types & construction in brief.		
5		HAWT versus VAWT - Advantages and disadvantages.		
6		Speed Control strategies for wind turbines - Yaw and tilt control, pitch control and stall control.		
7		Power Speed characteristics in various speed region		
8		Generators Suitable for Wind Power Generation-DC, Synchronous and Induction generators, advantages and disadvantages.		
9		Fixed speed drive scheme – power output versus wind speed characteristics		
10		Variable speed drive scheme – (a) Variable speed drive using power electronics (b) Scherbius Variable speed drive – block diagram (c) Variable speed direct drive – advantages and disadvantages.		
11		System integration – Effect of wind speed and grid condition.		
12		Wind energy storage – Major problems and Remedies, Environmental aspects of wind power		
	(Approx.Hrs: CI+ LI+SE+SL=22)	Unit4.0 PV cell		
1	1	PV cell characteristics and its equivalent circuit. Types of material used for PV cells	LE4.1 Measure the I-V and P-V characteristics of a given PV module.	

